GRANULAR AGGREGATE RESOURCES OF THE ACADIAN PENINSULA, NORTHEASTERN NEW BRUNSWICK

Open File Report 87-2

ISSN 0712-4562

NATURAL RESOURCES AND ENERGY

NEW BRUNSWICK

88-01205/

This report has been prepared by:

Minerals and Energy Division
Department of Natural Resources & Energy
Province of New Brunswick

Hon. Morris Green, Minister

1987

GRANULAR AGGREGATE RESOURCES OF THE ACADIAN PENINSULA, NORTHEASTERN NEW BRUNSWICK

Minerals and Energy Division

Department of Natural Resources and Energy

New Brunswick

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Report No.: OFR 87-2

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Cover: Tim Fevens
Catalogue No.:
ISSN 0712-4562

This report should be referenced in the following manner:

THIBAULT, J.J. 1987. Granular aggregate resources of the Acadian Peninsula, northeastern New Brunswick. New Brunswick Department of Natural Resources and Energy, Minerals and Energy Division, Open File Report 87-2, 86 p.

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ABSTRACT

Reserves of granular aggregate material in the Acadian Peninsula area of northeast New Brunswick are estimated at 4.0 million m^3. About one-third of these are associated with glaciofluvial complexes near Bois-Gagnon and in the Tracadie Military Training Area. The other major source is the Adams Brook esker system.

Glaciofluvial deposits consist of fair- to good-quality aggregate. Marine deposits are characterized by a high proportion of unsound sandstone lithologies and consist of poor-quality to very poor quality aggregate. The Caraquet Dyke is the only local potential source of hard bedrock.

RÉSUMÉ

Le volume des réserves de granulat dans la péninsule acadienne du nord-est du Nouveau-Brunswick est évalué à 4.0 million m^3. Environ le tiers de ces réserves sont associées aux complexes fluvioglaciaires des environs de Bois-Gagnon et du Centre d'entraînement militaire de Tracadie. L'autre source principale est l'esker Adams Brook.

Les dépôts fluvioglaciaires sont caractérisés par un granulat de qualité passable à bonne. Les dépôts marins, contiennent un haut pourcentage de grès tendre et la qualité du granulat est de pauvre à très pauvre. Le dyke de Caraquet est la seule source locale potentielle de roche dure.

INTRODUCTION

This report summarizes the results and findings of field investigations undertaken during the summer of 1985. The objective of this study was to provide basic information on the distribution, extent, thickness, and quality characteristics of granular aggregate deposits. The report is directed to both producers and consumers of granular aggregates in their search for workable deposits, as well as land-use planners concerned with efficient resource utilization, including forest managers.

LOCATION OF THE STUDY AREA

The area under investigation is located in northeastern New Brunswick and is bounded to the south by latitude 47°15' North and to the west by longitude 65°30' West (Figure 1).

PREVIOUS STUDIES

Gauthier and Cormier (1977) and Gauthier (1978; 1982; 1983) mapped the area as part of a regional study of the surficial geology of northern New Brunswick. The results of that study comprise a report and a series of 1:100 000 scale maps covering the area north of latitude 47°00'N. Rampton et al. (1984) published a report on the Quaternary geology of New Brunswick which includes a 1:500 000 scale surficial geology map of the province. The results of a reconnaissance survey of the aggregate resources in the Tracadie-centred area (Lohse 1976) have been incorporated in this study.

Soils of the Acadian Peninsula have in part been described by Michalica (1978).

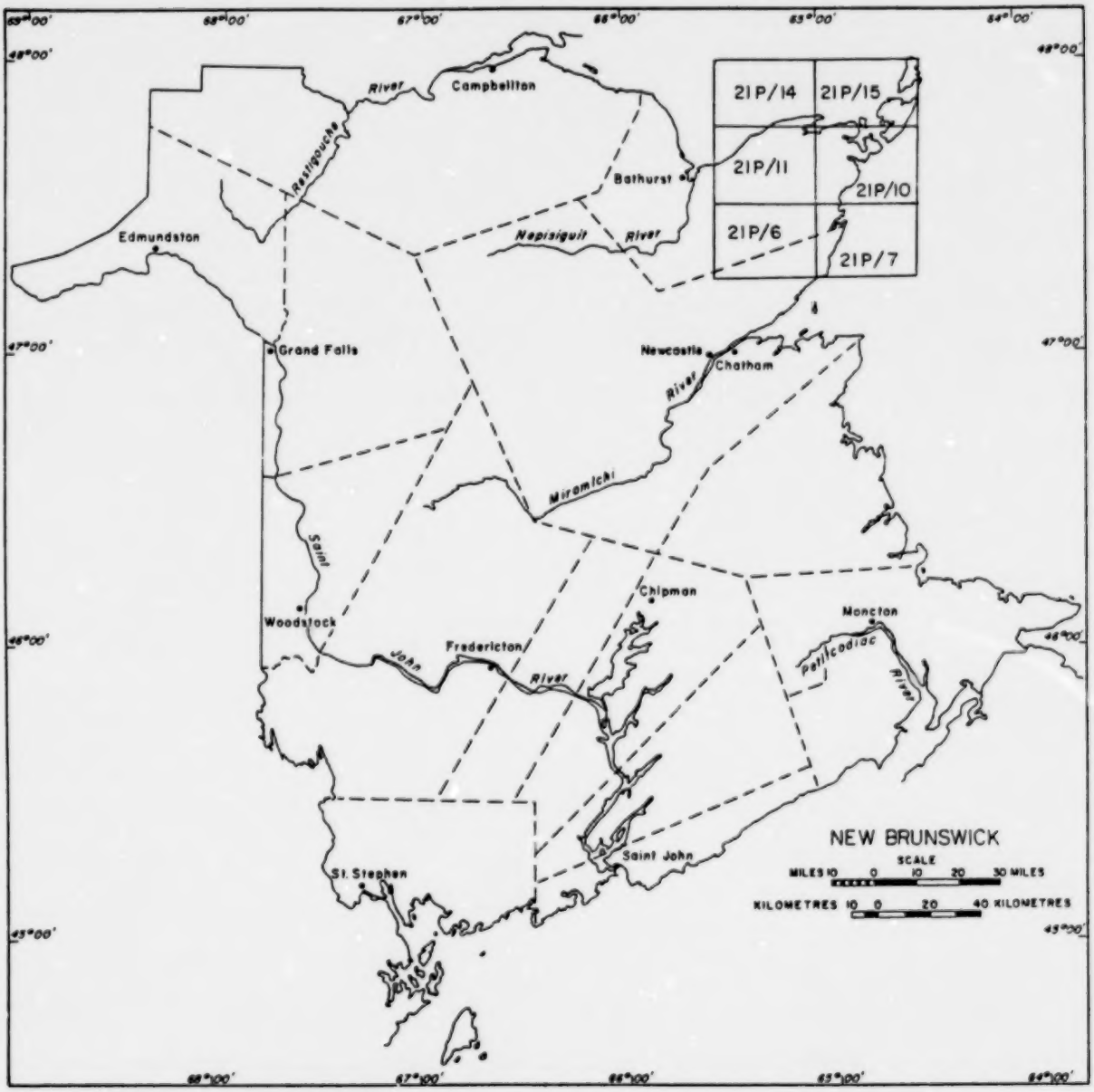

FIGURE 1. Location of the study area.

Ball *et al*. (1981) have summarized what is known about the bedrock geology of the study area.

ACKNOWLEDGEMENTS

Capable field assistance was provided by Daniel Doucet. The report was typed by Diane Blair; the maps were drafted by Terry L. Leonard. The report and maps were edited by Shasta A. Abbott.

PHYSIOGRAPHY

The study area lies within two physiographic subdivisions of the New Brunswick Lowlands (Rampton *et al*. 1984): the Acadian Peninsula and its extension, the Acadian Islands (Figure 2). From inland elevations of about 150 m near Allardville, the land surface slopes gently to sea level at the Gulf of St. Lawrence coast. The relief is low and is characterized by a gently undulating surface. The monotony of the landscape is broken only by isolated hills of more resistant bedrock and by morainic features. The consequent hydrographic network is aligned in a northeast to southwest direction. The streams are typically deeply incised into the bedrock and reach the coast as drowned estuaries. Drainage is moderately good near the streams, but poor in the headwater areas and along the coastal zone. The Gulf of St. Lawrence coastline is characterized by low scarps, spits, and baymouth bars, whereas cliffs up to 30 m high are present along the Chaleur Bay coast.

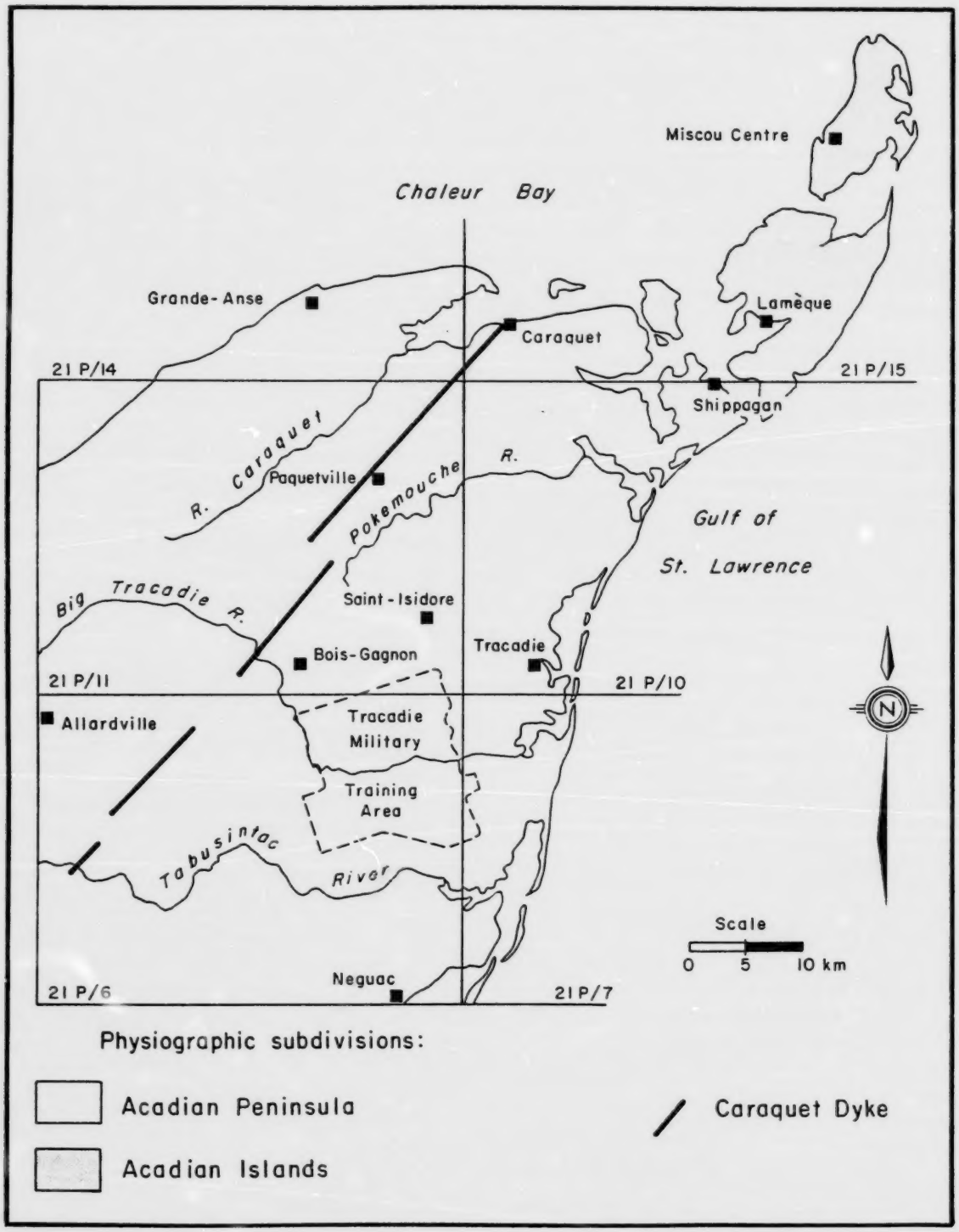

FIGURE 2. Physiography of the Acadian Peninsula.

BEDROCK GEOLOGY

The study area is underlain by flat-lying Carboniferous sedimentary rocks consisting primarily of Pennsylvanian greyish brown sandstone. A diabase dyke of Late Triassic age transects the Acadian Peninsula (Wanless et al. 1972). The bedrock geology is described in greater detail by Ball et al. (1981) and Legun (1980).

SURFICIAL GEOLOGY

Rampton et al. (1984) and Gauthier (1983) have summarized the sequence of events that ultimately led to the deglaciation of northeastern New Brunswick.

Pre-Late Wisconsinan events in the study area are not well documented, although Rampton et al. (1984, p. 41) postulate that subtill gravels observed by Gauthier (1983) may have originated before the Late Wisconsinan.

Direct evidence of glacial flow from striations is rare, but from regional observations and from patterns of dispersal of erratics, two principal directions of glacial transport are inferred.

An easterly flow is associated, at least during the early Late Wisconsinan, to the activity of the Laurentide Ice Sheet (Gauthier 1983). A high component of pebbles derived from the Miramichi Highlands reflect this strong eastward ice movement.

A westerly flow, originating from the Escuminac Ice Centre (Rampton et al. 1984) located in the Gulf of St. Lawrence, is inferred mainly from the westerly dispersal of diabase erratics of the Caraquet Dyke (Gauthier 1983).

The nature of the interplay between the two ice domains is not well documented nor understood but it began to affect the study area during the final deglaciation episode, the Chignecto phase (Rampton et al. 1984).

Deglaciation was closely followed by marine submergence of the isostatically depressed land surface, to an elevation of about 38 m. Dates on fossil marine shells in the study area range from 11 350 ± 200 BP (BGS-1065) to 12 600 ± 400 BP (GSC-1383).

GRANULAR AGGREGATE RESOURCES

FIELD AND LABORATORY METHODS

Information used in the determination of deposit boundaries and thicknesses was obtained by the examination of gravel pit faces and all other natural and man-made exposures that were encountered (see Appendices). Several exposures were made or improved by the use of shovels and hand-augering equipment.

Samples of granular materials were collected from available exposures with a sample site distribution designed to provide a reliable assessment of material qualities in the major deposits. Care was taken to obtain samples that were as representative as possible. All samples were subjected to wet-sieve analysis to

accurately determine the proportion of fine particles (less than 75 um). Supplementary data obtained from the Department of Transportation (DOT) were included in the Appendices. It included subsurface data obtained from augering operations and laboratory results of various tests performed on the granular aggregate material.

The average material depths used for volume calculations were arrived at by projecting the depths observed in pit excavations to areas beyond the pit boundaries, with the aid of geologic and topographic observations on the ground and from a study of the aerial photographs. Confidence in reserve figures is affected by the reliability of material thickness data and of deposit boundaries. In no case can reserve figures be absolutely definitive. Traditional exploration methods, including detailed test-pitting or drilling with power equipment, will be required for accurate evaluation of reserves.

QUALITY LIMITATIONS

The potential of many local granular aggregate deposits for use as high specification aggregate is limited by three major factors:

1) Fine particles: A high content of fine particulate matter (finer than 75 um) renders the material unsuitable for many uses, at least in the pit-run state. Washing can adequately lower the fine content but doing so increases the cost of exploitation.

Ablation till, some ice-contact and marine deposits are specially affected by this condition.

2) Clast lithotypes: High specification coarse aggregate should consist of hard, strong, uncoated, durable particles of crushed stone or gravel. Certain lithotypes are, in general, more resistant to breakdown than others. The lithologic analyses recorded in the Appendices divide the lithologic components into two groups according to whether they are regarded as being sound or unsound. The test is qualitative, being based on the determination of the lithotype of each clast in the sample and on its resistance to disintegration under impact. This test should not be confused with quantitative soundness tests employing sodium or magnesium sulphate (C88-73, ASTM 1974).

In general, the quality of the gravel found in the map area is moderate to poor.

3) Alkali-reactivity: Fine aggregate for use in concrete that will be subject to frequent wetting, extended exposure to humid atmosphere, or in contact with moist ground should be free of reactivity with alkalies in cement which may produce excessive expansion in, or cause deterioration of, the concrete.

SOURCES OF GRANULAR AGGREGATE

Tabusintac River (21 P/6) and Wishart Point (21 P/7): The Tabusintac River and the Wishart Point map areas (Plate 86-223; Appendix A) contain reserves of granular aggregate material estimated at 1.6 million m^3.

Glaciofluvial outwash and ice-contact deposits located near Allardville (P6-1, 2, 3) display material that is texturally very variable, locally excessively silty and dominated by poor local sandstone lithologies.

In excess of 900 000 m^3 of aggregate is found in an ice-contact complex located within the limits of the Tracadie Military Training Area (P-6). The material contains a high proportion of hard lithologies. Textural variability and locally, an excess of fines, may be limiting factors.

A glaciofluvial complex located south of Bois-Gagnon (P6-4) contains minimum reserves evaluated at 500 000 m^3. The material contains a high proportion of hard lithologies and the deposit is intensively worked by St-Isidore Asphalt and Ready Mix Ltée.

Deposits of marine origin have been extensively used as sources of borrow material in the Wishart Point map area. Most of these deposits are shallow and they typically contain a high proportion of local, poorly indurated lithologies, mainly sandstone.

Tracadie (21 P/10): The Tracadie map area (Plate 86-224; Appendix B) contains limited volumes of extractable aggregate. Marine deposits have supplied local needs in the past, but the remaining reserves are immobilized by highway and housing developments. The quality of the coarse aggregate is commonly poor due to a high proportion of soft local sandstone.

Burnsville (21 P/11): The Burnsville map area (Plate 86-225; Appendix C) contains an estimated 1.8 million m^3 of recoverable granular aggregate.

The principal source is the Adams Brook esker and associated outwash complex. Textural variability in the ice-contact portion of the deposit is high (Pl1-3) and in places, the texture is very coarse. The quality of the material is limited by a high sandstone content. The outwash deposit (Pl1-5) consists mostly of fine sediments.

A large ablation complex, the Paquetville moraine system, may contain important reserves of good quality aggregate. Its potential is not known however, because of limited exposures. The presence of till (Pl1-7) may limit the extraction potential.

Grande-Anse (21 P/14): The Grande-Anse map area (Plate 86-226; Appendix D) contains less than 500 000 m^3 of granular aggregate.

The principal sources are contained within marine deposits located near Village-Saint-Paul and Village-des-Poirier. The core of these deposits may be of ice-contact origin.

Caraquet (21 P/15): The Caraquet map area (Plate 86-227; Appendix E) contains less than 500 000 m^3 of granular aggregate material.

Marine deposits, mainly located on Lamèque Island, have been used locally as sources of fine and coarse aggregate. Most of these deposits are now nearing depletion and all contain high proportions of poorly indurated sandstone.

OTHER SOURCES OF AGGREGATE

A major source of borrow material is found in the weathered and shattered sandstone that occurs throughout the study area.

This material is of poor quality, with high Los Angeles abrasion loss values.

Hamilton and Gupta (1972) suggested that a diabase dyke, which traverses the study area, may have potential use as a good hard rock source. DOT (1977; 1984) analysed samples of the diabase and reported the following data:

Los Angeles Abrasion loss: 14.3% and 27.7%

Soundness loss (stone): 4.52% and 3.53% (sodium sulphate)

In 1984, DOT did some exploratory drilling across the path of the dyke in the Val-Doucet area (21 P/11, UTM 381 772). The site was selected because work by Hamilton and Gupta (1972) indicated that the dyke measured 45 m in width at this locality. The trace of the dyke was delineated by a magnetometer survey (Thibault 1984). Results of the drilling suggest that the dyke is narrower (5 to 20 m) than previously interpreted, and that except for a dense core, it is altered, vuggy and fractured. Others have also observed that the diabase was fractured (Lohse 1976; Barnett 1977).

CONCLUSIONS

Recoverable reserves of granular aggregate material in the study area are estimated at 4 million m^3. The glaciofluvial deposit located near Bois-Gagnon (P6-4, P11-8) is the principal source of quality aggregate. The ice-contact ridges in the Tracadie Military Training Area (P6-6, 112, 119, 120) offer some potential. Marine deposits along the coast are usually

shallow and characterized by a high percentage of unsound lithologies. The Caraquet Dyke is the only source of hard durable bedrock found within the study area, but its potential use as a source of crushed aggregate is affected by limited width, lack of good topographical expression, fracture and alteration of the rock.

REFERENCES

ASTM 1974. Concrete and Mineral Aggregate (including manual of concrete testing). American Society for Testing and Materials. Annual Book of ASTM Standards, Part 14, pp. 49-53.

BALL, F.D., SULLIVAN, R.M., and PEACH, A.R. 1981. Carboniferous Drilling Project. New Brunswick Department of Natural Resources, Mineral Development Branch, Report of Investigations No. 18, 109 p.

BARNETT, D.E. 1977. Sampling and Testing of the Caraquet Dike For Use as a Source of Aggregate. New Brunswick Department of Natural Resources, Mineral Resources Branch, Unpublished Internal Report, 7 p.

GAUTHIER, R.C. 1978. Quelques interprétations de l'inventaire des dépôts de surface, péninsule nord-est du Nouveau-Brunswick. In Report of Activities, Part A, Geological Survey of Canada, Paper 78-1A, pp. 409-412.

_____ 1982. Surficial Deposits, Northern New Brunswick. Geological Survey of Canada, Open File 856, 67 p.

_____ 1983. Surficial Materials of Northern New Brunswick. __ maps. Geological Survey of Canada, Open File 963.

GAUTHIER, R.C. and CORMIER, V. 1977. Cartographie des dépôts superficiels, péninsule nord-est du Nouveau-Brunswick. In Report of Activities, Part A, Geological Survey of Canada, Paper 77-1A, pp. 371-378.

HAMILTON, J.B. and GUPTA, V.K. 1972. The Caraquet Dike. New Brunswick Department of Natural Resources, Mineral Resources Branch, Topical Report 72-1, 32 p.

LEGUN, A.S. 1980. Sedimentology of the Clifton Formation (Upper Carboniferous) of Northern New Brunswick: A Semi-Arid Depositional Setting for Coal. MSc thesis (Unpublished), University of Ottawa, 97 p.

LOHSE, H. 1976. Granular Resources of the Tracadie Centred Region. New Brunswick Department of Natural Resources, Mineral Resources Branch, Topical Report 76-4, 13 p.

MICHALICA, K. 1978. Soil Survey of Northeastern New Brunswick. New Brunswick Department of Agriculture, Fredericton. Unpublished Maps, Scale 1:10 000.

THIBAULT, J. 1984. Geological Investigation of the Caraquet Dyke Near Val-Doucet (Gloucester County) - Drill Section and Magnetometer Survey. New Brunswick Department of Forests, Mines and Energy, Mineral Resources Division, Map Plate 85-4.

WANLESS, R.K. and LOVERIDGE, W.D. 1972. Rubidium-strontium isochron age studies, Report 1, pp. 57-59: Geological Survey of Canada, Paper 72-23, 77 p.

APPENDIX A

SITE DESCRIPTIONS OF

TABUSINTAC RIVER, 21 P/6 and WISHART POINT, 21 P/7 MAP AREAS

LOCATION:	P6-1	**NTS:**	21 P/6
TYPE OF DEPOSIT:	Outwash	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Allardville
STATUS:	Inactive	**UTM:**	143 609

SECTION DESCRIPTION & COMMENTS:

2.0 m Sand: Well-sorted, fine to medium sand, compact, with minor subrounded pebbles coated with red-brown silt (sample a).

0.5 m Sand: Moderately sorted, medium to coarse sand, loose, with fine pebble gravel (sample b).

0.5 m Slump Covered: Assumed to be mainly sand. The pit floor is underlain by red-brown sandy silt, compact, with subangular clasts up to 20 cm in diameter.

Sections in the pit measure from 2 to 5 m high and are mostly slumped. The material exposed is dominantly sandy and well sorted. Large sandstone slabs, exposed commonly on the pit floor, suggest the proximity of bedrock. Beds of well-rounded pebble to cobble gravel are exposed in the south-southwest part of the pit.

Paleocurrent direction of 100° was measured from cross-beds in the upper sand unit.

Southwest part of pit:

0.4 m Soil: Pebbly sand loam.

CONTINUED

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% a pass.					100.0	99.4	99.1	84.0	45.0	7.4	3.2
b	98.2	96.9	91.7	75.3	59.6	49.2	41.1	21.2	8.1	5.0	3.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 91%	Sound Lithotypes 9%
sandstone 88; weathered 3	quartz 8; felsic intrusive 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			(see text)

Location #: P6-1 (cont'd)

0.6 m Silt: Red-brown sandy silt with angular to subangular cobbles and pebbles.

0.4 m Sand: Fine to medium sand, brown, with red-brown silt laminae. Some pebbles, subangular to rounded.

1.5 m Slump Covered: Assumed to be mainly sand.

Bedrock is exposed in a pit, 400 m north of the present site. The material in that pit is generally much coarser and poorly sorted. It is worked on a demand basis.

DOT (1967) tests in the general vicinity show the thickness of sand to range from 0.6 m to 3.4 m, averaging 2.2 m thick. The material was recommended for use as borrow.

More material is probably present along the stream valley between P6-20 and P6-25, coinciding with a glaciofluvial outwash channel. Reserves are difficult to estimate because of the irregularity of the deposit, lack of exposures, and subdued relief. The quality of the material is probably poor throughout and suitable only as a source of fill.

LOCATION:	P6-2	**NTS:**	21 P/6
TYPE OF DEPOSIT:	Outwash	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Allardville
STATUS:	Inactive	**UTM:**	133 587

SECTION DESCRIPTION & COMMENTS:

Sections exposed in pit range from 2 to 4.5 m high. The material consists of coarse to very coarse sandy cobble gravel. Clasts are commonly up to 20 cm in diameter; boulders up to 1 m across have been observed in the pit. More than 90% of the clasts are well-rounded sandstone, but some granite (1 m boulder) and metamorphic (Tetagouche Group) lithologies occur.

The presence of angular sandstone fragments in parts of the pit suggest that the bedrock is present at shallow depths.

DOT (1968; 1975) tested the material and obtained the following results:

Los Angeles abrasion loss: range 60.4% to 75.6%; mode 70.2%
Percentage finer than 75 um: range 2.8% to 6.0%; mode 4.0%
Recommended usage: borrow and marginal subbase

Thicknesses encountered during test-pitting ranged from 0.6 m to 3.6 m.

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			(see P6-1)

LOCATION:	P6-3	**NTS:**	21 P/6
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Allardville
STATUS:	Inactive	**UTM:**	126 569

SECTION DESCRIPTION & COMMENTS:

A pit, opened in a small kame, exposes 2 to 3 m faces showing mostly sand overlain by a cobbly to pebbly blanket containing subangular to subrounded sandstone class. The deposit is part of a kame field.

Reserves have been calculated for the portion of the deposit that is adjacent to the access road. More material occurs north and south, in association with an ablation till unit and with outwash channels. Ill-drained lands limit the potential of the deposit.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.							100.0	99.3	95.3	41.0	11.3

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
15	10	2	200 000

LOCATION:	P6-4	**NTS:**	21 P/6
TYPE OF DEPOSIT:	Outwash	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Allardville
STATUS:	Active	**UTM:**	334 628

SECTION DESCRIPTION & COMMENTS:

St-Isidore Asphalt and Ready Mix Ltée operates a pit on Crown Lands. Faces average about 4 to 6 m in height and expose horizontally stratified sand and gravel. In one part of the pit, cross-bedded sand at the base of one section suggests a southerly paleoflow. Bedrock occurs in the southwest part of the pit.

DOT (1979) tested the material and obtained the following results:

Los Angeles abrasion loss: range 25.9% to 32.9%; mode 29.4%
Percentage finer than 75 um: range 2.1% to 12.6%; mode 8.0%
Soundness loss: stone 15.66%, 17.29%; sand 6.54%, 6.41%
Sand equivalent: 60
Recommended usage: borrow, subbase, and base (3.2 cm crushed)

The origin of the deposit is still uncertain. Gauthier (1982) did not identify it on his maps. The abundance of exotic clasts in the gravel indicates a western source for the material. Morainic landforms in the general vicinity suggest that its emplacement is related to the melting of a lobe of ice located in the headwaters of the Pokemouche River (Butte d'Or) area (Plate 86-225). The absence of definite ice-contact features points to a glaciofluvial outwash origin.

CONTINUED

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: DOT (1985)

Unsound Lithotypes 33%	Sound Lithotypes 67%
limestone 16; sandstone 12; volcanic 4; intrusive 1	limestone 23; volcanic 19; sandstone 14; diabase 6; quartz 3; intrusive 2

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
	25+	2	500 000

Location #: P6-4 (cont'd)

The boundaries of the deposit are ill-defined because of the subdued nature of the landform surface and the forest cover. Boundaries as shown on Plate 86-223 are based on vegetation, major surface features (channels, scarps), test-pitting by DOT, and by a hammer-seismic survey. Traverses east and northeast of the pit area show the presence of different types of material at the surface, varying from sand to pebbly silty sand to compact till.

There are significant reserves to the northwest of the present pit area. Minimum recoverable reserves are evaluated at 500 000 m^3. More material can probably be found east of the present pit area.

LOCATION:	P6-5	**NTS:**	21 P/6
TYPE OF DEPOSIT:	Glaciofluvial	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Saumarez
STATUS:	Abandoned	**UTM:**	365 572

SECTION DESCRIPTION & COMMENTS:

1.5 m Sand and Gravel: The upper metre is silty and reddish brown in colour. Poorly sorted material.

0.3 m Bedrock: Greenish sandstone.

Textural analysis: 48.0% gravel, 51.5% sand, and 0.5% fines.

The deposit may reflect grading to a higher base level as sea inundated the Tracadie River valley following deglaciation.

MECHANICAL ANALYSIS: (see text)

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 51 %	Sound Lithotypes 49%
sandstone 33; weathered 14; slate 3; calcite 1	felsic volcanic 15; sandstone 9; metasediment 7; quartzite 7; mafic volcanic 4; quartz 3; felsic intrusive 2; limestone 1; mafic intrusive 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			Minimal

LOCATION:	P6-6	**NTS:**	21 P/6
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Saumarez
STATUS:	Active on demand	**UTM:**	445 555

SECTION DESCRIPTION & COMMENTS:

The pit exposes faces 2 to 6 m high, mostly slumped, showing moderately loose sandy fine to coarse pebble gravel. Some beds are clast-supported with very little sandy matrix. A more compact horizon at the top of the section may be till. There is a high proportion of exotic lithologies. Marine reworking of the deposit is inferred from the presence of small fragments of calcium carbonate.

Reserve estimates below apply to the entire ice-contact system.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	83.4	78.6	74.9	60.8	49.2	33.9	24.7	14.8	8.2	5.2	4.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 36%	Sound Lithotypes 64%
sandstone 26; weathered 9; felsic intrusive 1	quartzite 19; sandstone 17; mafic volcanic 12; felsic volcanic 8; quartz 4; mafic intrusive 3; felsic intrusive 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
110	30	3	900 000

LOCATION:	P6-7	**NTS:**	21 P/6
TYPE OF DEPOSIT:	Glaciofluvial	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Saumarez
STATUS:	Abandoned	**UTM:**	492 572

SECTION DESCRIPTION & COMMENTS:

East Face:

4.0 m Sand and Gravel: Horizontally stratified sand and gravel. The upper 1.5 m is dirty and cemented. Clast lithologies include many sound types. Water ponding at the base of the pit.

North Face:

1.0 m Sand and Gravel: Horizontally stratified.

1.2 m Silt: Sandy gravelly silt, till-like.

1.5 m Sand and Gravel: Very silty, reddish brown sand and gravel.

Textural analyses: gravel 38.0%, 36.8%; sand 45.0%, 59.9% sand; and fines 17.0%, 3.3%

Percentage of unsound rock types: 79%, 86%

MECHANICAL ANALYSIS: (see text)

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: (see text)

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			Minimal

LOCATION:	P6-8	**NTS:**	21 P/6
TYPE OF DEPOSIT:	Marine	**COUNTY:**	Northumberland
EXPOSURE TYPE:	Pit	**PARISH:**	Alnwick
STATUS:	Active on demand	**UTM:**	453 395

SECTION DESCRIPTION & COMMENTS:

The pit exposes 2- to 3-metre faces showing well-rounded, well-sorted, stratified sand and pebble gravel displaying good lateral textural continuity. Stratification dips north suggesting a beach or submarine-bar origin to the deposit. Sandstone bedrock floors the pit.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.		97.1	89.8	69.6	57.2	50.9	46.5	31.8	5.4	1.4	0.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 98%	Sound Lithotypes 2%
sandstone 98	sandstone 1; quartzite 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable

P6-100 UTM 174 625

An abandoned borrow pit showing 1 to 2 m of coarse sandy ablation till.

P6-101 UTM 196 633

An inactive pit showing coarse ablation till overlying sandstone bedrock. Sections range from 2 to 4 m high.

P6-102 UTM 137 604

A road cut exposes 1.5 m of pebbly sand along a small outwash terrace. Away from the valley, red-brown sandy silt till is found at shallow depths, typically underlying a sandy loam veneer, generally less than 0.5 m thick. Tests in the general area by DOT (1968) give the following:

Los Angeles abrasion loss: range 50.7% to 64.9%
Percentage finer than 75 um: range 2.7% to 4.9%
Recommended usage: borrow

P6-103 UTM 157 554

A small borrow pit exposes 3 to 4 m sections showing up to 1 m of compact stony silt till containing subrounded sandstone and some granitic clasts, overlying very fractured sandstone with sand in interstices. A small morainic ridge.

P6-104 UTM 177 548

A small abandoned pit showing 2 to 3 m sections of compact stony (bouldery) silty sand till; some granite erratics. Bedrock probably occurs at shallow depth below the pit floor.

P6-105 UTM 219 526

Sandy road surface with rounded pebbles (no boulders). Probably outwash material.

P6-106 UTM 246 367

A sandstone quarry, active on demand. The upper lift shows sandy ablation till over compact red-brown lodgment till overlying fractured sandstone bedrock.

P6-107 UTM 269 381

Large active quarry. Sections show till over sandstone. At time of visit, a crusher was being operated. Faces range from 3 to 4 m in height.

P6-108 UTM 326 515

A small pit exposes 2 to 2.5 m of compact sandy stony till.

P6-109 UTM 183 388

An active sandstone quarry. In 1985, the material was crushed and graded on site and used to upgrade Highway 8. Sections measured 4 to 5 m in height.

P6-110 UTM 335 559

Road cut exposing less than 2 m of thin interbedded silty fine sand, fine sandy gravel and sand.

P6-111 UTM 412 558

Test pit showing 1.2 m poorly horizontally stratified sand and gravel. Possibly outwash grading to a higher marine stand. High proportions of hard lithologies. Textural analysis: 54.9% gravel, 47.8% sand, and 0.3% fines. Percentage of unsound lithologies - 25%.

P6-112 UTM 454 569

An abandoned pit showing 4 to 6 m gravelly sandy material. The upper metre is slightly silty. High proportion of hard lithologies. Textural analysis: 50.2% gravel, 48.2% sand, and 1.6% fines. Percentage of unsound lithologies - 63%. Probably an esker segment related to the deposit lying south, in the Bears Brook valley.

P6-113 UTM 455 566

A test pit dug 1 m into a terrace shows slightly silty sand and gravel overlying compact dirty grey-black sandy material (sandstone?). Probably an older terrace remnant. Significant percentage of sound lithologies. Textural analysis: 22.1% gravel, 43.4% sand, and 34.5% fines. Percentage of unsound lithologies - 68%.

P6-114 UTM 492 599

Road cut showing 1 m gravelly silty fine sand, probably marine and shallow over bedrock.

P7-115 UTM 528 607

A shallow excavation shows 1 m of interstratified sand and fine sandy gravel. Main pebble lithology is sandstone. This occurrence is typical of the area submerged following deglaciation and represents shallow marine reworked sediments. Textural analysis: 7.3% gravel, 82.4% sand, and 0.3% fines. Percentage of unsound lithologies - 99%.

P7-116 UTM 573 622

A flooded and abandoned pit exposed 1.5 m horizontally stratified sand and gravel. The texture of the material varies from fine sand to coarse gravel. Clasts are almost all of local origin and consist of poorly indurated sandstone. Textural analysis: 66.3% gravel, 32.8% sand, and 0.3% fines.

P7-117 UTM 555 617

A pit exposes 1.7 m of horizontally bedded sand and gravel. Some layers are well sorted (all fine gravel); some are more sandy. Limonite- and manganese-cemented gravel occurs in the top metre of the section. The material rests on greenish sandstone bedrock. Textural analysis: 48.3% gravel, 50.1% sand, and 1.6% fines. Percentage of unsound lithologies - 95%.

P7-118 UTM 546 598

Pit faces expose 0.6 to 1.2 m of poorly stratified sand and gravel overlying 3 m of green sandstone bedrock.

P6-119 UTM 447 537

A test pit exposes 0.5 m of silty sand and gravel soil over 0.5 m of fine to medium sand with about 15% gravel. Ice-contact ridge.

P6-120 UTM 467 552

A test pit dug into an ice-contact ridge, about 5 m high shows 0.6 m of silty sand and gravel soil over 0.3 m of gravelly sand (about 25% gravel). Sound lithologies are evaluated at 50%.

P7-121 UTM 540 536

A pit displayed 1.5 m of horizontally stratified sand and gravel overlying 1.5 m of horizontally stratified fine to medium sand and medium to coarse gravel (gravel slightly coarser than overlying unit). Textural analyses: 44.8%, 60.0% gravel; 54.7%, 39.8% sand; and 0.5%, 0.2% fines. Percentage of unsound rock types - 100%.

P7-122 UTM 539 535

A pit displayed the following stratigraphy: 0.5 m soil horizon, over 0.5 m sand and gravel, fine to medium sand and medium gravel, over 1.8 m fine to medium sand with minor red silty layers, over 0.6 m slumped material. Textural analyses: 61.2%, 1.3% gravel; 37.6%, 97.8% sand; and 1.2%, 0.9% fines. Percentage of unsound rock types - 99%.

P7-123 UTM 549 550

An abandoned pit showed 1.5 m horizontal beds of fine sand and gravel. Water ponded at the base of the pit. Textural analysis: 50.8% gravel, 47.9% sand, and 1.3% fines. Percentage of unsound lithologies - 100%.

P7-124 UTM 525 501

An inactive pit exposes 0.3 m soil horizon over 1 m horizontally stratified sand and gravel, overlying 1.2 m weathered sandstone bedrock. Textural analysis: 54.3% gravel, 44.6% sand, and 1.1% fines. Percentage of unsound lithotypes - 99%.

P7-125 UTM 530 503

An inactive pit displayed 1 m sand and gravel over 0.6 m reworked bedrock overlying sandstone bedrock.

P6-126 UTM 457 445

A road cut near an abandoned pit showed 0.3 m cross-bedded sandy gravel overlying 1.5 m massive fine to medium sand. Textural analysis: 3.9% gravel, 95.4% sand, and 0.7% fines.

P6-127 UTM 473 407

An inactive pit showed 1 m of horizontally stratified imbricated gravel, mostly sandstone, overlying sandstone bedrock.

APPENDIX B

SITE DESCRIPTIONS OF

TRACADIE MAP AREA, 21 P/10

LOCATION:	P10-1	**NTS:**	21 P/10
TYPE OF DEPOSIT:	Marine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Shippegan
STATUS:	Active on demand	**UTM:**	729 854

SECTION DESCRIPTION & COMMENTS:

1.8 m Sand and Gravel: Horizontally stratified sand and gravel; beds dip slightly northward.

1.2 m Slump Covered: Assumed to be sand and gravel.

1.5 m Bedrock: Sandstone.

The thickness of material ranges from 2 m to 3.5 m. Significant thicknesses are only encountered along the axis of the beach ridges.

Textural analysis: 54.2% gravel, 45.3% sand, and 0.5% fines.
Percentage unsound lithologies: 88%

The deposit has been extensively worked and urbanization is a limiting factor to further extraction. Recoverable reserves are low.

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable

P10-100 UTM 705 848

A pit exposes 1.2 m sand and gravel, slightly silty. Reserves are small and limited by a shallow water table. Textural analysis: 32.5% gravel, 65.7% sand, and 1.8% fines. Percentage of unsound pebbles - 82%.

P10-101 UTM 723 853

A pit exposes 1.2 m of horizontally bedded sand and gravel overlying 1.8 m of sandstone. Textural analysis: 42.9% gravel, 56.0% sand, and 1.1% fines. Percentage of unsound pebbles - 77%.

P10-102 UTM 760 891

A borrow pit exposes 3 m of horizontally stratified sand and sandy gravel. High percentage of hard lithologies noted. Textural analysis: 33.1% gravel, 65.8% sand, and 1.1% fines. Percentage of unsound pebbles - 68%

P10-103 UTM 778 886

A borrow pit exposes 3 m of cross-bedded sand and gravel. Textural analysis: 40.8% gravel, 58.7% sand, and 0.5% fines. Percentage of unsound lithologies - 72%.

P10-104 UTM 606 811

A pit exposed 1.5 m of horizontally stratified sand and gravel. DOT (1975) tested the deposit and concluded that the reserves were depleted. Test-pitting showed 1.2 to 2.1 m of silty sand over clay.

P10-105 UTM 637 833

A pit showed 1.2 m sand and gravel, horizontally bedded. Platy sandstone pebbles are abundant. Textural analysis: 63.5% gravel, 35.7% sand, and 0.8% fines. Percentage of unsound lithologies - 100%.

P10-106 UTM 615 784

An inactive pit exposed 4.5 m horizontally stratified sand and gravel. Textural analysis: 25.3% gravel, 74.1% sand, and 0.6% fines. Percentage of unsound lithologies - 56%.

P10-107 UTM 616 778

An inactive pit showed 1.8 m horizontally stratified sand and gravel. Textural analysis: 32.7% gravel, 66.3% sand, and 1.0% fines. Remaining reserves are located in the eastern half of the deposit.

P10-108 UTM 551 744

Test pits, 1.5 m deep, exposed stratified gravelly sand. The two nearby gravel pits are shallow and were abandoned at time of visit.

P10-109 UTM 579 747

An abandoned pit showed 4.5 m sections displaying horizontally stratified sand and gravel. Water ponded at base of pit. The site is now a junk yard. Textural analysis: 56.3% gravel, 42.8% sand, and 0.9% fines. Percentage of unsound lithologies - 75%.

P10-110 UTM 575 737

An inactive pit exposes 2.1 m sand and gravel. Textural analysis: 48.8% gravel, 49.0% sand, and 2.2% fines. Percentage of unsound lithologies - 54%. Testing by DOT (1969) in the vicinity gave the following results:

Los Angeles abrasion loss: range 43.3% to 46.1%; mode 43.5%
Percentage finer than 75 um: range 1.7% to 6.4%; mode 4.5%
Suggested use: borrow material

Water was found at depths ranging from 1.2 to 2.4 m and bedrock was encountered at 1.8 m in several places. Up to 4.3 m of fine gravel was observed.

P10-111 UTM 634 756

This pit is now mostly abandoned. Faces showed 2.4 m horizontally bedded gravelly sand over 1 m very silty sand with some gravel. Water was seen ponding at the base of the pit suggesting the shallow presence of bedrock or till. A pit, 350 m northwest is operated on a demand basis. Reserves are nearing depletion, especially along the axis of the principal beach ridge. Percentage of unsound lithologies - 48%.

P10-112 UTM 629 748

This inactive pit displays 1 m of horizontally stratified sand and gravel overlying very soft grey sandstone.

P10-113 UTM 585 734

An abandoned pit exposes 1 m of poorly horizontally stratified sand and gravel overlying 1.5 m of well-sorted fine to coarse gravelly sand. Textural analysis: 22.8% gravel, 77.2% sand, and 0.2% fines. Percentage of unsound lithologies - 72%.

P10-114 UTM 567 728

DOT (1969) tested this site, located along a beach ridge complex. Results show the following:

Los Angeles abrasion loss: 31.3%, 32.5%
Percentage finer than 75 um: range 2.9% to 4.4%; mode 3.9%
Suggested use: borrow material

Test pits show the presence of up to 3.3 m of sand and gravel, but in some places, clay was located below less than 1 m of sand.

P10-115 UTM 533 716

An abandoned pit exposed 3 m of horizontally stratified sand and gravel with a significant proportion of exotic lithologies. DOT (1967) tested material in the general area and obtained the following results:

Los Angeles abrasion loss: range 20.7% to 40.8%; mode 37.6%
Percentage finer than 75 um: range 2.7% to 6.9%; mode 4.5%
Suggested use: borrow and sand filter material

Test-pitting indicated an average of 1.5 to 3 m of sand to gravelly sand over clay or sandstone bedrock. Water was commonly encountered during test-pitting. Percentage of unsound lithologies is 53%. Reserves are thought to be minimal.

P10-116 UTM 539 696

An inactive pit exposed 2.1 m of horizontally stratified sand and gravel. Textural analysis: 18.4% gravel, 80.0% sand, and 1.6% fines. Percentage of unsound lithologies - 50%. Reserves are minimal.

P10-117 UTM 497 663

An inactive pit showing 2.1 m of sand and gravel, silty toward the top of the section. The owner claims to have found shells in pit (circa 1953). Percentage of unsound lithologies - 47%.

P10-118 UTM 498 661

An inactive pit showing 3 m of stratified sand and gravel, dipping into valley. The upper metre is silty. Calcite coats some pebbles. May be glaciofluvial outwash (marine reworked). Percentage of unsound lithologies - 34%.

P10-119 UTM 530 640

A small pit exposed 3 m of cross-bedded sand and gravel with reddish silt laminae. The percentage of unsound lithologies is 98%.

P10-120 UTM 540 650

A small abandoned pit exposed 1.8 m of horizontally bedded sandy gravel with some red silt layers, becoming finer and more sandy to the west.

APPENDIX C

SITE DESCRIPTIONS OF

BURNSVILLE MAP AREA, 21 P/11

LOCATION:	P11-1	**NTS:**	21 P/11
TYPE OF DEPOSIT:	Glaciofluvial	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	New Bandon
STATUS:	Active on demand	**UTM:**	176 819

SECTION DESCRIPTION & COMMENTS:

At the time of visit, only the far western part of the pit showed any signs of activity. One front-end loader was working the deposit at shallow depths (less than 2 m).

A hand-dug hole showed a hard compact silty layer (till?) below about 0.5 m of dirty sandy gravel. This explains why water accumulates on the pit floor area and suggests that reserves are limited.

Coarse fraction contains varied lithologies and the roundness of clasts is variable. The deposit is texturally immature. A study of the aerial photographs suggests that the deposit is low and elongate.

A road cut leading to the pit area displayed the following:

1.0 m Gravel: Moderately sorted pebbly sandy gravel.

0.1 m Silt: Fine to medium sand within a band of clayey silt.

0.5 m+ Till: Compact red-brown pebbly silt till.

The cover of granular material over most of the deposit is probably in the order of 1 to 2 m. More work is needed to properly assess the boundaries of the deposit.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	93.6	86.7	82.2	71.2	58.1	39.1	27.0	14.5	6.7	5.0	3.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 54%	Sound Lithotypes 46%
sandstone 42; weathered 10; mafic intrusive 2	quartzite 17; quartz 8; sandstone 8; felsic intrusive 6; metasediment 4; felsic volcanic 3

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			Limited

LOCATION:	P11-2	**NTS:**	21 P/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pits	**PARISH:**	Paquetville
STATUS:	Abandoned	**UTM:**	349 794

SECTION DESCRIPTION & COMMENTS:

0.9 m Sand: Cross-bedded fine to medium sand.

0.3 m Silt: Red sandy silt, slightly clayey.

1.2 m Sand and Gravel: Cross-bedded fine to coarse sand and fine gravel. The percentage of unsound rock types is 87%.

Channel sampling of the section shows 16% gravel and 84% sand with negligible silt content.

On the south side of Highway 340, another pit showed 0.9 m of fine to medium sand overlying 0.6+ m of silty material, containing angular sandstone fragments (ablation till?).

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			(see P11-34)

LOCATION:	P11-3	**NTS:**	21 P/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Road cut	**PARISH:**	Paquetville
STATUS:	Undeveloped	**UTM:**	336 7[illegible]

SECTION DESCRIPTION & COMMENTS:

A road cut exposes material from an esker associated with the Adams Brook meltwater channel. Where exposed, the material consists of crudely stratified and very coarse sandy, cobbly to bouldery pebble gravel. The percentage of fines is low. Large clasts generally consist of rounded to well-rounded sandstone. Sandstone is also the main lithologic component of the finer gravel fraction. The material is mainly of local origin. Sections are 2 to 3 m high.

From here, the esker bifurcates to the northeast. It gradually diminishes in relief to the southwest. The material was too coarse for sampling.

Reserves have been calculated for the various esker segments found along Adams Brook valley and Ruisseau de la Corne valley.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 95%	Sound Lithotypes 5%
sandstone 95	felsic volcanic 3; sandstone 1; mafic volcanic 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
60	30	2	600 000

LOCATION: P11-4 **NTS:** 21 P/11

TYPE OF DEPOSIT: Fluviomarine **COUNTY:** Gloucester

EXPOSURE TYPE: Pit **PARISH:** Paquetville

STATUS: Active on demand **UTM:** 457 801

SECTION DESCRIPTION & COMMENTS:

2.0 m Sand: Uniform well-sorted medium sand with minor red-brown silt bands (2 to 5 cm thick).

Flooding at base of pit suggests the presence of silt or till. About 500 m to the southeast, an inactive pit displays 2 m of horizontally stratified fine to medium sand with minor coarse sand beds.

Test-pitting will be necessary to confirm the actual extent of the reserves. The deposit is interpreted to be a fluviomarine feature, probably deltaic in origin.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.					100.0	99.9	99.8	98.9	65.5	16.9	2.5

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
55	20	1.5	300 000

LOCATION:	P11-5	**NTS:**	21 P/11
TYPE OF DEPOSIT:	Glaciofluvial	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Paquetville
STATUS:	Active on demand	**UTM:**	276 727

SECTION DESCRIPTION & COMMENTS:

Sections are mostly slumped and 3 to 4 m high on average. Material exposed is dominantly sandy (over 90%). There are locally some gravelly beds and some rhythmically laminated red-brown silt and fine sand. Clasts are of local origin.

Most of the material in the pit has red-brown hue except for well-sorted white sand found in a low lift in the western part of the pit. Beds dip northeastward.

The eastern portion of the deposit is lobate in outline and has a flat surface marked by irregular depressions. The western portion has been dissected. A blanket of sand extends away from the deposit, to the southeast.

About 4 km south of the present locality, undefined deposits of sand and gravel are present in the Tracadie River valley and adjacent land. Some of that material is probably outwash since channels have been observed on the plain. Some ice-contact forms are probably present. Till and bedrock are commonly encountered at or near the surface.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	100.0	98.0	98.0	97.1	93.1	87.6	55.7	10.8	4.2	2.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 94%	Sound Lithotypes 6%
sandstone 94	sandstone 4; metasediment 1; mafic volcanic 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
Outwash 70	35	2	700 000
Esker 15	5	3	150 000

LOCATION:	P11-6	**NTS:**	21 P/11
TYPE OF DEPOSIT:	Glaciofluvial	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	New Bandon
STATUS:	Abandoned	**UTM:**	231 677

SECTION DESCRIPTION & COMMENTS:

1.0 m Sand and Gravel: Gravelly sand, moderately sorted, with rounded clasts.

1.0 m Sand: Well-sorted, stratified, fine to medium sand.

2.0 m Slump Covered: Assumed to be sandy material.

Another section, at the northern extremity of the pit, displayed 2.0 m of stratified, but poorly sorted pebble gravel and sand. In places, the gravel has a silty sand matrix and is compact. Loose sandy gravel at the base. Clasts are rounded to subrounded.

About 200 m southeast of the present locality, across South Branch Big Tracadie River, a road cut exposed 2 m of sand and gravel.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.					100.0	99.3	98.9	86.9	16.9	3.9	2.5

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
		2	Limited

LOCATION:	P11-7	**NTS:**	21 P/11
TYPE OF DEPOSIT:	Ice-contact	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Allardville
STATUS:	Active on demand	**UTM:**	335 654

SECTION DESCRIPTION & COMMENTS:

Back Section, Facing Southwest:

7.0 m Sand and Gravel: Extremely variable material, from loose pebbly gravelly sand (sample a) to compact pebbly silt diamicton. Red-brown colouration of sediment throughout. Abundance of exotic lithologies. Roundness of clasts varies from subangular to well-rounded.

Throughout the pit, texture varies quickly, rapidly and vertically. Beds are deformed and stratification is commonly irregular. Coarse material is common with boulders up to 50 cm in diameter and larger. Sand beds are uncommon; the material is either very silty or gravelly (poor sorting). Weathered clasts are common in section.

Reserve estimate is conservative. Similar material may be present southwest of Highway 360. A number of morainic landforms similar to P11-7 are found in the general area (see Plate 86-225). All of these landforms are potential sources of aggregate, but exposures are few and test-pitting is necessary to evaluate them.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% a pass.	93.7	88.0	81.4	63.8	49.5	35.6	26.7	16.6	7.7	3.3	2.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 39%	Sound Lithotypes 61%
sandstone 33; weathered 4; siltstone 2	sandstone 22; quartzite 12; felsic volcanic 8; limestone 7; mafic volcanic 6; quartz 5; felsic intrusive 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
6	1	5.0	50 000

LOCATION:	P11-8	**NTS:**	21 P/11
TYPE OF DEPOSIT:	Outwash	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Allardville
STATUS:	Abandoned	**UTM:**	335 641

SECTION DESCRIPTION & COMMENTS:

The pit is abandoned and depleted. Sandstone outcrops along the northeast face. Sections are steep, high and mostly slumped. Generally, the material consists of stratified sandy pebble gravel, but sand beds occur near the top of some sections. Exotic lithologies are abundant, including limestone. In places, calcium carbonate cementation has been observed. The material is siltier in the southeast part of the pit.

The deposit is associated with a belt of morainic landforms and was probably formed in an ice-marginal environment.

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 26%	Sound Lithotypes 74%
sandstone 24; weathered 2	limestone 26; quartzite 14; sandstone 14; mafic volcanic 9; quartz 6; metasediment 3; felsic volcanic 2

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			Minimal

LOCATION: P11-9 **NTS:** 21 P/11

TYPE OF DEPOSIT: Ice-contact **COUNTY:** Gloucester

EXPOSURE TYPE: Pit **PARISH:** Saint-Isidore

STATUS: Active on demand **UTM:** 376 679

SECTION DESCRIPTION & COMMENTS:

Northwest Face:

3.0 m Till: Sandy near surface, changing progressively to a redder and more compact till. Clasts are subangular to subrounded. At 2 m depth, the till changes to a purplish silt till, returning to a dark brown hue at about 3 m depth.

7.0 m Slump Covered: Stratigraphy obscured; assumed to be as above.

Laterally variable, the material changes to sand and gravel with minor red silty horizons.

DOT (1967) tested the material and obtained the following:

Los Angeles abrasion loss: 27.2%, 27.4%
Percentage finer than 75 um: range 4.0% to 7.2%
Recommended usage: borrow, borderline subbase

Hilly topography northwest and south of Lac St-Coeur is typically morainic. Exposures are rare and till is usually encountered at the surface. The presence of sand and gravel at this locality suggests that more granular material may be found within this morainic system. Deeper test-pitting would be needed to confirm this. Because of this uncertainty, reserves have not been calculated.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.						100.0	99.5	94.2	59.9	19.4	7.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 28%	Sound Lithotypes 72%
sandstone 19; weathered 5; limestone 3; calcite 1	limestone 33; sandstone 11; metasediment 6; mafic volcanic 6; quartzite 6; felsic volcanic 5; mafic intrusive 3; quartz 2

ESTIMATION OF RESERVES: N.A.

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable

P11-100 UTM 192 828

The pit was operated intermittently in 1985. Sections exposed 1 to 2 m of sand and gravel. Extensive ponding of water on the pit floor suggests till at shallow depth. The deposit is probably of shallow-marine origin, related perhaps to a wave-cut scarp (crossed by Highway 340, 2 km to the east). Abandoned pits to the northwest probably displayed the same stratigraphy.

P11-101 UTM 218 855

Three small pits, now abandoned and overgrown, were recommended by DOT (1966) as sources of borrow and borderline subbase. Test-pitting showed 1 to 2 m of sandy gravel and sand, commonly limited by a high water table, suggesting till or bedrock at shallow depth. Testing of the material gave the following results:

Los Angeles abrasion loss: 31.9% to 36.1%
Percentage finer than 75 um: range 2.5% to 7.8%; mode 3.1%

P11-102 UTM 249 825

A trench exposes red-brown silt till, over 20 cm oxidized and compact medium sand, over stratified diamicton varying in colour from olive-brown to red-brown. One granite erratic seen in the section. One kilometre south of this locality, on the south side of Highway 340, a 1.5 m granite erratic can be seen.

P11-103 UTM 297 781

The pit is now mostly abandoned. Some minor activity exposes sections averaging 2 to 3 m in height, displaying till over fractured sandstone bedrock. The large ablation till features mapped in the vicinity are moraines. Hand-dug holes show up to 1 m of moderately loose, stony, dirty sand with subangular clasts, mostly sandstone fragments. Significant reserves of borrow-quality material are present in the general area.

P11-104 UTM 332 789

A road cut through an ice-contact ridge exposes 4 to 5 m of coarse cobbly sandy gravel. Shallow sand and gravel occur in the general area as an associated blanket of outwash.

P11-105 UTM 349 840

Small inactive sand pit. Sand and pebbly gravel blanket the valley of Innishannon Brook to depths in excess of 2 m. In most places however, there is less than 2 m of material over the compact silt till. Red-brown silt horizons have also been observed. Alluvium grading to a higher sea level?

P11-106 UTM 364 812

An abandoned pit showing 1 m of cobble gravel overlying sandy till and sandstone bedrock. Outwash blanket associated with the Adams Brook glaciofluvial system.

P11-107 UTM 364 855

An inactive pit showing about 1 m of gravel and sand overlying red-brown silt till, overlying sandstone bedrock.

About 200 m to the southwest, another inactive pit shows over 2 m of sand with red-brown silt and silty sand beds. The material is moderately to well sorted.

About 700 m to the east, an abandoned pit shows 2 to 3 m of sand. This material is probably of alluvial origin, related to a higher marine stand. It may, in part, be deltaic.

P11-108 UTM 383 836

A section in the pit displays 1 m of coarse ablation till over fractured sandstone. The pit is operated on demand. Sections are 2 to 4 m high. Other quarry sites to the south are abandoned.

DOT (1966) tested the material in the general area and obtained the following results:

Los Angeles abrasion loss: 97.9%
Percentage finer than 75 um: 4.5%

Because of excessive abrasion losses, the material was recommended as a source of borrow.

P11-109 UTM 428 824

An abandoned till and sandstone borrow pit. Outcrops of the Caraquet diabase dyke are exposed at this locality. About 0.6 m of diabase, flanked by altered sandstone, occurs along a 1.5 m section. The diabase is intensely jointed.

P11-110 UTM 439 800

An abandoned sandstone quarry. DOT (1966) tested the fractured sandstone and obtained the following results:

Los Angeles abrasion loss: 84.7%
Percentage finer than 75 um: 4.3%
Recommended use: borrow only

P11-111 UTM 479 796

Section near river shows 1.5 m of sand overlying red-brown till and sandstone bedrock.

P11-112 UTM 179 745

Road cut displays about 2 m of sand containing red silty sand bands, overlying till and bedrock. Associated with an important outwash channel system.

P11-113 UTM 192 676

An inactive pit showing 2 to 4 m fractured sandstone overlain by ablation till. Clasts are mostly of local origin.

P11-114 UTM 306 669

A large quarry operated on demand exposes 6 to 7 m high sections displaying 0.5 to 1 m of cobbly ablation till over deformed bedrock, over fractured bedrock.

P11-115 UTM 267 703

Inactive borrow pit exposing less than 0.5 m dirty sand and gravel (ablation till?) over 1.5 to 2 m fractured sandstone bedrock.

P11-116 UTM 268 729

An inactive pit showing a sandy soil underlain by 20 cm pebbly sand and by 4 m of well-sorted stratified medium sand.

P11-117 UTM 271 682

Abandoned borrow pit. Sections expose silty sandy stony till with subangular clasts. Bedrock probably occurs at shallow depth.

About 400 m to the southwest, a road cut exposes sand and gravel associated with a small ice-contact ridge.

P11-118 UTM 260 689

Aerial photograph interpretation suggests the presence of a small segmented esker in the Tracadie River valley. Downstream channelling and outwash sediments support this.

P11-119 UTM 380 773

Diabase outcrops on J. Doiron Road. Drilling by DOT (1984) confirmed the presence of the Caraquet Dyke, as determined previously by a magnetic survey (See section on the Caraquet Dyke in this report).

P11-120 UTM 365 735

Outwash channel: 1 m of fine to medium sand overlying gravel.

P11-121 UTM 378 743

An abandoned pit showing 2 m of coarse, poorly sorted sandy gravel, locally cobbly; clasts are subrounded to rounded. About 450 m to the southeast, a road cut shows 1.3 m+ well-sorted fine to medium sand, possibly deltaic. Further along the road, going south-southeast, the sand cover thins and a compact pebbly red-brown silt till is exposed. No significant accumulations are expected - blanket deposit.

P11-122 UTM 312 680

Compact, cobbly, pebbly, silty sand till (ablation) containing a high proportion of exotic lithologies of western provenance.

P11-123 UTM 312 680

A hole dug on top of a rounded hill showed 70 cm of pebbly sandy silt till, very compact, red-brown in colour with a few cobbles. Part of a system of morainic landforms.

P11-124 UTM 470 662

A quarry, active on demand, exposes 4 to 5 m of sandstone, overlain by a veneer of red-brown till. Coal seams observed in sections; bedrock is deformed. About 800 m east of the present locality, some sand is associated with channelling of the landscape.

P11-125 UTM 455 682

Small borrow pit consisting of 1 to 1.5 m of poorly sorted glaciofluvial (ice-contact) sand, overlying sandstone bedrock.

P11-126 UTM 347 653

Abandoned pit. Moderately loose, dirty gravelly sand with cobbles and small boulders (ablation till). Abundant exotic lithologies. Rounding of clasts is poor to good.

P11-127 UTM 380 659

Road cut showing 2 m of moderately loose, silty pebbly sand. Clasts are subangular to subrounded (ablation till).

P11-128 UTM 439 650

Very dirty, sandy gravel, all sandstone clasts, overlying deformed sandstone bedrock. Ice-contact glaciofluvial material.

P11-129 UTM 490 658

A quarry exposes 4 to 6 m sections consisting of fractured sandstone. Coarse poorly sorted outwash or marine-reworked bedrock occurs in the southwest part of the quarry.

P11-130 UTM 490 647

About 1 m of compact red-brown pebbly silt diamicton (till?) overlying 2.5 to 3 m horizontally stratified sandy gravel with minor silt layers; possible shell fragments. High proportion of exotic lithologies. The potential for finding similar material in the general vicinity is high.

Testing of material in the general area by DOT (1966) gave the following results:

Los Angeles abrasion loss: range 29.5% to 39.3%
Percentage finer than 75 um: range 3.4% to 7.8%; mode 4.1%
Recommended usage: borrow and pitrun subbase
Overburden depth: 0.3 to 1 m

P11-131 UTM 490 641

An inactive pit showing less than 1 m of sand and sandstone gravel (marine reworked?) over 2 m of fractured sandstone.

P11-132 UTM 358 655

Large road cut in red-brown compact pebbly silt till. Abundant exotic lithologies.

P11-133 UTM 474 765

A 1.5 m road cut exposing very silty sand and gravel. Clasts are competent lithologies. Associated with an outwash channel.

P11-134 UTM 386 838

An abandoned pit. Sections are 2.0 m high and show 0.6 m of fine sand overlying sandstone bedrock. Overlying the sand is a gravel bed consisting of all sizes of particles up to 30 cm in diameter. In general, the matrix is a fine sand, but locally there are patches of red clay. Clasts are mainly (90%) sandstone.

P11-135 UTM 253 652

An inactive pit exposing 3.7 m faces. The material consists of very angular and blocky sandstone fragments, 1.0 to 7.5 cm in diameter, set in a matrix of fine to coarse sand with some clay and silt (ablation till). An adjacent similar deposit, south of Highway 360, displays 1.2 m of ablation till over 1.5 m sandstone.

P11-136 UTM 428 782

A quarry, active on demand. Interstratified red-brown sandy to silt till and glaciofluvial sands, moderately sorted but consisting of subangular sandstone fragments. Deformed sandstone bedrock at the base. The till contains exotic lithologies but the glaciofluvial material consists entirely of local sandstone fragments.

APPENDIX D

SITE DESCRIPTIONS OF

GRANDE-ANSE MAP AREA, 21 P/14

LOCATION:	P14-1	**NTS:**	21 P/14
TYPE OF DEPOSIT:	Fluviomarine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Cliff	**PARISH:**	New Bandon
STATUS:	Undeveloped	**UTM:**	309 950

SECTION DESCRIPTION & COMMENTS:

At the mouth of the Pokeshaw River, a coastal section exposes the following stratigraphy:

At the base, resting on Carboniferous sandstone, a unit of coarse, glaciofluvial cobbly gravel with a high percentage of local lithologies. Overlying this unit, a dense red-brown pebbly silt diamicton on top of which is a unit of fossiliferous well-sorted gravel and coarse sand with a high percentage of exotic lithologies.

Shell material has been collected for dating. Mollusc fossils are plentiful and many speciments were found intact in life position. Rare gastropods have been collected.

The deposit has accumulated at the mouth of the Pokeshaw River and partly fills the river valley. More material might be found along the west bank of the river southeast of Highway 11. Test-pitting will be necessary to verify this.

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			(see text)

LOCATION:	P14-2	NTS:	21 P/14
TYPE OF DEPOSIT:	Marine	COUNTY:	Gloucester
EXPOSURE TYPE:	Pits	PARISH:	New Bandon
STATUS:	Inactive	UTM:	344 957

SECTION DESCRIPTION & COMMENTS:

A series of pits have been developed on the low, back side of a wave-cut sandstone cuesta. The pits are for the most part inactive except locally where material has been removed for fill. Sections vary in height from 2 to 6 m.

The stratigraphy exposed is similar throughout and consists of 2 to 4 m of sandy pebble gravel, loose, oxidized and in places fossiliferous overlying 2 to 4 m of red-brown compact pebbly silt diamicton. Fossil fragments were found only in the southwest part of the pit. The preservation state was poor.

Bedrock is exposed in the southwest part of the pitted area and elsewhere, at the base of the lower lifts.

This is a spit or beach system associated with a bedrock high and the 25 m contour elevation. A noticeable wave-cut scarp is visible along Highway 11.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.		91.8	79.8	58.1	41.6	31.7	28.5	23.3	14.7	7.4	4.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 81%	Sound Lithotypes 19%
sandstone 76; weathered 4; metasediment 1	metasediment 5; felsic volcanic 4; sandstone 4; quartz 2; limestone 2; felsic intrusive 1; mafic volcanic 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			Limited

LOCATION:	P14-3	**NTS:**	21 P/14
TYPE OF DEPOSIT:	Fluviomarine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	New Bandon
STATUS:	Abandoned	**UTM:**	392 954

SECTION DESCRIPTION & COMMENTS:

Most of the pit area is now abandoned and pit faces are mostly slumped, except for the southwest extremity where some limited activity has taken place recently.

Sections vary from 2 to 6 m and expose pebble gravel with various proportions of loose and horizontally bedded sand. Various sources report the presence of shell fragments in the sections although none were observed at time of visit (M. Thériault, personal communication; Departmental files). Texture is uniform throughout the deposit. Clasts are mainly subrounded and there is a high proportion of exotic lithologies.

About 1 km northeast of the present locality, at P14-3A (UTM 401 960) a shallow excavation exposed about 2 to 3 m of sandy pebble gravel, well-sorted, overlying compact red-brown pebbly silt till. The site is active on demand.

Tests by DOT (1966; 1969) gave the following results:

Los Angeles abrasion loss: 31.9% to 40.3%; mean 39.5%
Percentage finer than 75 um: 3.0% to 9.7%; mean 4.9%
Recommended usage: borrow, subbase

The main portion of the deposit has been intensively worked but additional reserves exist to the southwest and northeast of the present excavations.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	99.8	93.2	76.7	60.1	45.1	36.2	23.8	11.1	7.1	5.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 47%	Sound Lithotypes 53%
sandstone 37; weathered 6; quartz 2; siltstone 2	quartzite 17; mafic volcanic 10; felsic volcanic 9; sandstone 8; felsic intrusive 5; mafic intrusive 3; quartz 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
15	5	3	150 000

LOCATION:	P14-4	**NTS:**	21 P/14
TYPE OF DEPOSIT:	Fluviomarine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	New Bandon
STATUS:	Active	**UTM:**	455 961

SECTION DESCRIPTION & COMMENTS:

At time of visit, a Michigan front-end loader was operating in one part of the pit. The maximum section height was about 6 m.

Exposed material consisted of loose, well-stratified, horizontally bedded, pebbly sand beds and sandy, cobbly gravel beds. Sorting is good; rapid vertical textural variations but horizontally continuous. Individual beds are 10 to 20 cm thick. Rounding of pebbles is moderate and there is a high proportion of exotic lithologies.

The sample was obtained from a sandy unit.

MECHANICAL ANALYSIS:

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.		98.2	94.6	83.2	73.3	60.3	50.5	37.9	12.0	3.6	2.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 84%	Sound Lithotypes 16%
sandstone 75; weathered 6; felsic intrusive 2; siltstone 1	quartzite 4; sandstone 3; felsic intrusive 3; mafic intrusive 2; mafic volcanic 1; felsic volcanic 1; quartz 1; metasediment 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
17	8	3	240 000

LOCATION:	P14-5	**NTS:**	21 P/14
TYPE OF DEPOSIT:	Fluviomarine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pits	**PARISH:**	New Bandon
STATUS:	Active on demand	**UTM:**	375 918

SECTION DESCRIPTION & COMMENTS:

2.0 m Sand: Loose, oxidized, pebbly, medium to coarse sand. A high proportion of exotic lithologies suggests a glaciofluvial origin for the material. Rounding is poor - subrounded to subangular. Some thin beds (5 cm) of clast-supported, fine pebble gravel and coarse sand. Horizontal bedding.

Till: Red-brown compact, pebbly silt till.

Bedrock is probably close to the base of the pit as suggested by the presence of angular sandstone fragments on the floor of adjacent pit.

The surficial cover is probably locally extensive but shallow. The potential of the deposit is limited.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.	98.8	95.7	91.1	74.3	56.0	39.1	30.7	20.8	8.9	4.9	4.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 58%	Sound Lithotypes 42%
sandstone 48; weathered 7; felsic intrusive 3	quartzite 9; felsic intrusive 7; sandstone 6; felsic volcanic 5; metasediment 5; mafic volcanic 5; quartz 4; mafic intrusive 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
			Limited

P14-100 UTM 488 995

Inactive quarry exposing a shallow marine cover of sandy material over weathered, fine-grained, grey, cross-bedded sandstone. DOT (1966) tested the sandstone and rated it for borrow only. Los Angeles abrasion rate 80.4%; fraction finer than 75 um - 2.2%

P14-101 UTM 495 980

A series of pits have been opened in a northeast-trending beach ridge. The deposit covers about 30 ha and has been used as a source of fill. Data collected during the Hamilton and Carroll aggregate survey (1970; field notes) give for location 304705403 (Lat. 47°49'06", Long. 65°00'13") the following description: "... alternating beds of sand and gravel. Sand beds (5 cm to 30 cm) are generally fine-grained. Gravel beds 5 cm to 20 cm thick consist of 0.2 cm to 2.5 cm pebbles, with fine-grained sand matrix. Some gravel beds contain pea sized pebbles with sea-shell fragments and no matrix. Pebbles sub-rounded with appreciable amount of sandstone pebbles.". The presence of shells in that deposit could not be verified during the present survey but shells have been found in the general area in a similar geological setting. The coordinates of site 304705403 may be incorrect but the observations were certainly made in the immediate vicinity of P14-101.

P14-102 UTM 355 958

A long and narrow beach ridge has been worked as a local source of fill. The pit is now abandoned and overgrown. Material exposed consists of pebbly sand and gravel. DOT (1969) tested material in the vicinity:

Los Angeles abrasion loss: 57.0% to 60.4%
Fraction finer than 75 um: 1.8% to 8.7% with mean of 4.0%

Bedrock occurs at depths ranging from 1 to 3 m and the material was recommended for borrow only.

P14-103 UTM 284 933

Sections in an inactive sandstone quarry show a 1 to 1.5 m cover of loose, pebbly, oxidized silty sand over fractured bedrock.

P14-104 UTM 293 941

A small pit has been opened in a cliff-top dune to supply sand fill.

P14-105 UTM 417 697

The upper lift consists of 2 m thick fine gravel beds with cross-bedded sand. Gravel beds are also cross-bedded and consist of 0.2 to 2.5 cm particles with a matrix of sand, in places absent. Clasts are rounded to subrounded. The lower lift exposes 2 m of grey thin-bedded sandstone with minor coal seams. The material is suitable only as a source of fill. DOT (1966) obtained the following results:

Los Angeles abrasion loss: 46.6%
Percentage of material finer than 75 um: 4.9%

The workings were abandoned at time of visit.

P14-106 UTM 421 922

An abandoned pit showing 1 m of pebbly sand overlying 3 m of fractured sandstone.

P14-107 UTM 472 918

An abandoned pit showing 1.5 m of horizontally bedded fine to coarse sand and gravel overlying a 3 m exposure of sandstone. The main pebble lithology is sandstone. The material is only suitable for fill. Gravel 46.8%, sand 53.1%, and fines 0.1%. Percentage of unsound rock types - 92%.

APPENDIX E

SITE DESCRIPTIONS OF

CARAQUET MAP AREA, 21 P/15

LOCATION:	P15-1	**NTS:**	21 P/15
TYPE OF DEPOSIT:	Marine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Shippegan
STATUS:	Active on demand	**UTM:**	822 073

SECTION DESCRIPTION & COMMENTS:

East Face

0.4 m Gravel and Sand: Horizontally bedded, fine pebble gravel and sand. Clasts are rounded.

2.0 m Sandy Gravel: Coarse cobbly pebbly gravel and sand. Slumped faces obscure any statification present. Clasts are generally rounded to well rounded and of varied lithologies, many exotic types. The material is loose and fossiliferous. Molluscs and gastropods have been collected from this site (see section on Surficial Geology).

Bedrock: Fractured, poorly indurated grey sandstone with some shale beds and thin coal seams.

The deposit thins rapidly to the west and to the east, away from the crest.

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 69%	Sound Lithotypes 31%
sandstone 60; weathered 9	sandstone 9; mafic volcanic 7; quartz 4; felsic intrusive 4; quartzite 3; felsic volcanic 2; limestone 1; mafic intrusive 1

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
		1.5	Minimal

LOCATION:	P15-2	**NTS:**	21 P/15
TYPE OF DEPOSIT:	Marine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Shippegan
STATUS:	Abandoned	**UTM:**	847 003

SECTION DESCRIPTION & COMMENTS:

0.9 m Sand and Gravel: Soil horizon underlain by very silty sand and gravel. Principal lithology is sandstone.

0.8 m Sand and Gravel: Well-sorted sand and gravel. Principal lithology is sandstone.

0.6 m Till: Red clayey silt till.

Another pit, about 100 m north of P15-2, active on demand, exposes 1 m of sand and gravel overlying sandstone bedrock. Material in the area is extracted from shallow marine features (spits mainly). These features are locally narrow and of limited thickness.

Field estimate of texture: 25% gravel, 75% sand.

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
		1	Limited

LOCATION:	P15-3	**NTS:**	21 P/15
TYPE OF DEPOSIT:	Marine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Shippegan
STATUS:	Active on demand	**UTM:**	804 966

SECTION DESCRIPTION & COMMENTS:

0.5 m Overburden: Soil and silty sand and gravel.

3.0 m Sand and Gravel: Fine- to coarse-grained sand, fine- to coarse-grained gravel, mostly horizontally bedded, in places cross-bedded. Main pebble lithology is sandstone.

Results of granulometric tests are as follows: gravel 38.2%, sand 59.8%, and fines 2.0% Unsound rock types amount to 66%

The deposit consists of a large beach complex that is relatively shallow. It has been extensively worked in the past. Bedrock is present under fine pebble gravel and well-sorted medium sand in another pit, 300 m north of P15-3.

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
60	7	2.5	175 000

LOCATION:	P15-4	**NTS:**	21 P/15
TYPE OF DEPOSIT:	Marine	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Pit	**PARISH:**	Shippegan
STATUS:	Inactive	**UTM:**	793 940

SECTION DESCRIPTION & COMMENTS:

2.4 m Sand and Gravel: Horizontally stratified sand and gravel. Clasts are predominantly sandstone. Maximum clast size observed was 25 cm.

Gravel 53.4%, sand 46.2%, and fines 0.4%. Unsound rock types amount to 80%.

The deposit is linear with significant workable thicknesses of material limited to the central portions of the ridge. Elsewhere, bedrock will probably be present at a shallow depth. Significant reserves of low-grade material remain.

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES:

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable
45	10	2.0	200 000

LOCATION:	P15-5	**NTS:**	21 P/15
TYPE OF DEPOSIT:	Bedrock	**COUNTY:**	Gloucester
EXPOSURE TYPE:	Quarry	**PARISH:**	Caraquet
STATUS:	Inactive	**UTM:**	545 951

SECTION DESCRIPTION & COMMENTS:

A diabase dyke is exposed in the coastal cliff near Pointe à Brideau. The attitude of the dyke is near vertical and it is about 10 m wide. Zones of massive and competent rock change laterally to zones of altered, fractured, and nodular rock.

Since its discovery, the Caraquet diabase dyke has been considered a potential source of crushable quality material. In most places, it is probably too narrow to be developed.

Testing by DOT (1984) gave the following results:

Los Angeles abrasion loss: 27.7%
Soundness loss: 3.53% (sodium sulphate)

MECHANICAL ANALYSIS: N.A.

sieve		25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% pass.											

LITHOLOGIC ANALYSIS: N.A.

Unsound Lithotypes	%	Sound Lithotypes	%

ESTIMATION OF RESERVES: N.A.

Total Deposit Area (hectares)	Area Workable (hectares)	Average Thickness (metres)	Recoverable Reserves (m^3) Probable

P15-100 UTM 847 159

Road cuts through a unique natural beach landform in New Brunswick. The "Grande plaine" consists of a beautiful series of curvilinear beach ridges that have accumulated to the west of an old sandstone shore cliff. Littoral drift is to the north. This environment is very sensitive to disturbance.

P15-101 UTM 855 149

A series of shallow pits has been opened in a beach deposit of pebble, gravel, and sand. Pit faces range in height from 1 to 3 m. All workings are abandoned and flooding observed at the base of some pits suggest the presence of bedrock or till at shallow depth.

P15-102 UTM 793 039

An abandoned and overgrown pit. Material consists of 0.3 m cross-bedded and horizontally bedded sand (90%) and gravel (10%) over 0.6 m loose angular sandstone fragments over 1.6 m weathered sandstone.

P15-103 UTM 751 964

Sandstone has been used as a local source of borrow material. The Los Angeles abrasion loss in this area is 81.5% and the fraction finer than 75 um amounts to 5.2%.

P15-104 UTM 837 997

A ridge of marine sand and gravel has been extensively worked over the years. The pits are inactive or abandoned. A typical section exposes 2.1 m of poorly stratified silty sand and gravel over sandstone bedrock. The principal pebble lithology is sandstone. Reserves are depleted. Gravel 53.9%, sand 43.0%, and fines 3.1%. Unsound rock types - 78%.

P15-105 UTM 830 969

Section exposed 1.2 m marine sand and gravel over 0.3 m fine to medium sand, horizontally bedded overlying 1.5 m cross-bedded coarse sand and gravel with silty layers. Gravel 51.6% to 62.0%, sand 36.5% to 43.2%, and fines 0.7% to 1.5%. Unsound rock types 58% to 61%. Reserves are limited.

P15-106 UTM 827 950

Section exposed 1.5 m of horizontally bedded sand and gravel. The principal pebble lithology is sandstone. The maximum clast size averaged 5 cm in diameter. Gravel 23.2%, sand 74.8%, and fines 2.0%. Unsound rock types - 64%. This marine deposit has limited reserves of low-grade borrow material.

P15-107 UTM 803 930

Section exposed 1.5 m of fine to coarse sand with minor proportions of gravel. Maximum pebble size about 7 cm. Gravel 25.2%, sand 73.8%, and fines 1.0%. Unsound rock types total 81%.

P15-108 UTM 812 916

Section exposed 2.1 m of horizontally bedded sand and gravel. The maximum clast size averaged 15 cm. Gravel 33.5%, sand 64.1%, and fines 2.4%. Unsound rock types total 64%. Reserves are limited and the material is suitable mainly for fill.

P15-109 UTM 562 940

A road cut exposes 1.5 m of horizontally bedded, fine to medium sand with minor thin beds of coarse sand and gravel. Gravel 11.3%, sand 87.7%, and fines 1.0%. This is a shallow marine deposit with limited reserves.

P15-110 UTM 578 938

An abandoned pit, 7.6 m deep, exhibiting very dirty gravel, probably marine in origin. Maximum clast size about 20 cm. Another pit, 200 m southeast of P15-110 shows similar material to a depth of 2 m. Limited potential.

APPENDIX F

HAMMER REFRACTION SEISMIC SURVEY

1985

In the absence of subsurface data, the hammer-seismic technique has been used locally to determine the thickness of granular aggregate material.

In the table below, the symbol "V" refers to the velocity of an induced seismic wave in a layer of material of thickness "D". Velocities less than 1500 m/sec are interpreted as indicative of sand and gravel.

Location	NTS	UTM	V_1	V_2	V_3	D_1	D_2	Elevation*
BG-1	21 P/11	342 644	513	1750	-	8.1	10.2	(N.A.)
BG-2	21 P/11	345 643	1414	-	-	20.7	-	73
BG-3	21 P/6	333 623	470	2000	-	3.9	13.4	77
BG-4	21 P/6	336 623	632	2600	-	5.5	8.7	74
BG-5	21 P/6	334 622	666	2500	-	3.0	6.4	(N.A.)
BG-6	21 P/11	336 653	975	1765	-	11.3	19.3	71
BG-7	21 P/11	335 649	538	1196	-	2.8	27.3	77
BG-8	21 P/11	341 649	500	818	2300	1.0	4.2	70
BG-9	21 P/11	343 649	625	1737	-	2.4	12.2	71
BG-10	21 P/11	331 633	416	2000	-	4.9	13.4	77
BG-11	21 P/11	330 631	519	1200	3000	5.0	10.1	82
BG-12	21 P/6	330 626	500	958	2429	1.1	8.6	74
BG-13	21 P/6	332 625	533	1929	-	3.8	18.4	74

*Elevation in metres above mean sea level by aneroid barometer.